REMARKS

Applicants respectfully request reconsideration of the above-captioned application. The claims 1, 2, 3, 6, 7, 9, 10, 12, 13, 14, 16 and 17 are currently pending.

The final Office Action dated July 29, 2003 included a rejection of claims 1-6, 9 and 11-15 under 35 U.S.C. §103 as allegedly being unpatentable over the Thony et al. patent (U.S. Patent No. 6,023,479) in view of the Wu et al. article. (Wu et al., "CO^{2+}:$MgAl_2O_4$ *Crystal Passive Q-Switches Performance at 1.34, 1.44 and 1.54 Microns",* OSA TOPS, ASSL, Davos, Switzerland, pp. 254, (February 16, 2000)) and a rejection of claim 8 under 35 U.S.C. § 103 as allegedly being unpatentable over the Thony et al. patent in view of the Wu et al. article, and in further view of the Molva et al. patent (U.S. Patent No. 5,495,494). The recitations of claim 8 have been added to claim 1 (including the recitations of intermediary claim 5 and additional recitations) and therefore the first rejection will be rendered moot upon entry of these changes.

However, to avoid further confusion with respect to the present application, Applicants would like to take this opportunity to further explain the aspects of the Molva patent that may have been overlooked by the Examiner.

The Molva patent discloses a microlaser having a thin film saturable absorber and an active medium, wherein the thin film absorber is deposited directly on the active medium. Molva teaches two different ways of depositing the saturable absorber on the active medium, namely i) as an organic thin film, with an organic dye dissolved in a polymer solvent and ii) as an epitaxied film.

For the first case, regarding the polymer, Molva states that it is possible to deposit the thin film on any laser material (col. 4, lines 4-7). However, Molva acknowledges the problem of low damage threshold for the polymer thin film, and that this makes it necessary to operate at lower energy levels. For the polymer thin film, Molva states that the thickness of the film is only a few microns (1-10 μm).

For the second case, regarding the epitaxied thin film, Molva teaches that this makes it necessary to use a base material identical to that of the substrate, or at least using materials having very similar crystal structures (col. 3, lines 63-67). The thickness of the epitaxied thin film can be 1-500 μm (col. 4, lines 27-30).

The disclosure of Molva regarding the first case above (polymer thin film) is irrelevant to the present invention, because the spinel-type crystal according to the present invention is of an entirely different class of materials. Spinel crystals are solid crystals, and cannot be used in any way resembling the (liquid) thin film polymer in accordance with Molva.

Regarding the second case, Molva has in a clear way explained the requirement of the absorber to have a crystal structure identical or very similar to the base material (i.e. the active medium) in order for epitaxy to be an option. However, according to our invention, the active medium comprises erbium-doped glass. Hence, glass notably being an amorphous material, an epitaxied layer of spinel crystal cannot be deposited on the active medium.

Further, Molva states that a saturable absorber film could be deposited, in one of the above ways, on either side of the active medium (col. 8, lines 45-50; Fig. 4), thereby making it possible to absorb more energy from the pumping beam.

None of these ways could be employed in the laser arrangement according to the present invention. Also, it is respectfully submitted that the Office has not fully appreciated this passage in Molva. For an understanding of the reason to have two saturable absorbers, reference is first made to the operation of the saturable absorber, as explained by Molva (col. 1, lines 40-47). More specifically, the absorber prevents laser action for a limited period of time, during which time pumping energy is stored in the active medium. Hence, if the absorber becomes saturated prematurely, less pump energy will be absorbed in the active medium. Since Molva makes use of thin film absorbers, this problem of premature saturation can become a limiting factor for the laser. Notably, the absorber film according to Molva cannot be obtained with arbitrarily large thickness. Therefore, in order to absorb more of the pump light, Molva suggests placing an absorber on either side of the active medium, thereby effectively doubling the absorber thickness. Nevertheless, Molva acknowledges the drawbacks of having an absorber on the side closest to the pump source (col. 8, lines 49-50), in that the film located on the side of the entrance beam (i.e., closest to the pump source) will be subjected to greater wear due to the pumping beam. It is the Applicants' view that the greater wear in this embodiment of the Molva patent of the absorber film closest to the pump source is due to excess heating of the film by active medium. The thin film apparently simply cannot handle and dissipate the heat generated in the active medium.

In this respect, it should be noted that a main portion of the pump beam is absorbed close to the input surface of the active medium, thus generating the most heat in this region. However, according to the present invention, the saturable absorber is comprised of a solid crystal bonded to the active material, wherein the

bulk of the solid absorber is employed for dissipating heat generated in the active material, thereby improving the performance of the laser beyond what could be obtained without any absorber on the input side of the active material.

In light of the foregoing, Applicants respectfully request reconsideration and allowance of the above-captioned application. Should any residual issues exist, the Examiner is invited to contact the undersigned at the number listed below.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

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By: ______________________
Charles F. Wieland III
Registration No. 33,096

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620